

EVA 3 BRIEFING CARD

EV1 _____
EV2 _____
IV _____
R1/M1 _____

Flight Day Prior to EVA - General Briefing (All)

1. EVA Prep
 - Get-up Plan - clothing and EMU equipment bag - EV1
 - Prebreathe protocol review (Notes and Warnings) - IV
 - Equipment lock activities - IV responsibilities
 - Suit donning plan - special requests - EV's, IV's
 - SAFER, MWS, tools, C-Lk positions, bag stowage - EV2
 - Airlock depress review - IV
2. EV Crew Procedure Review - EV1
 - Egress Plan
 - Order of tasks (summary timeline)
 - Translation plan, fairleads, and tether swaps
 - Hazards
 - Ingress Plan
3. Robotics - R1/M1
 - SRMS/SSRMS initial position, maneuvers, clearances
 - Coordinate Frames
 - SRMS/SSRMS comm protocol review - expected calls, use first names
 - GCA - when, where, handover language
 - Cameras
 - Contingencies
4. Communications - CDR, IV
 - Overall setup: big loop, A/G2, S/G2, ICOM, Hardline, remind EV crew when mode swapping
 - EV/IV comm protocol review - Use EV1(2) for DCM sw throws (all time in A/L), use first names otherwise

EVA Prep start (GMT) ____/____:____
Depress to 10.2 ____:____
Start Purge ____:____
PET 00:00 ____:____

Flight Day Prior to EVA - Additional Briefing (EV, IV)

5. General Procedure Review - EV1
 - Repair Techniques - IV
 - Get ahead tasks
 - Constraints - ground and flight - IV
 - Notes, Cautions, and Warnings review - IV
 - Contingency procedures - crib sheet
 6. Emergencies Review - EV1
 - Emergency suit doff and power down during EVA prep
 - Lost comm
 - EMU malfunctions
 - Lost tools
 - Lost crewmember
 - DCS
 - Abort and Terminate scenarios, protocols
 - Hand signal reviews
 7. Post EVA - IV's
 - Suit doffing responsibilities
 - Post EVA plan
- √ Expedited Suit Doffing and Briefing cue cards positioned for EVA

EVA Day, prior to Prebreathe Protocol

1. Reminders
 - Tool and bag check
 - Safety Tethers: tug test, hooks locked, gate closed
 - RET and Adj hook visual checks
 - APFR and WIF procedures
 - Hazards
 - Abort and Terminate review
 - First post-egress action/s review

EVA 3

EVA 3 BRIEFING CARD (Cont)

IV Checklist Verification Items

1. Generic
 - Day/Night Cycles
 - √ Lights, gloves, tethers, and MWS
 - √ Load Alleviating Strap on Safety Tethers not damaged
 - Crew report: "**Safety Tether strap looks good**"
 - √ Safety Tether Crew Hooks Slidelock are locked
 - Crew Report: "**Locked and locked**"
 - √ Both SAFER valves down at egress
 - Crew Report: "**Both handles down**"
 - √ APFR locking collar Black-on-black and pull test
 - Crew Report: "**Black-on-black, good pull test**"
 - √ PGT Green light on for bolt engage
 - May get Lo Torque msg at bolt release
 - Crew Report: "**Torqued out, XX turns (or green light)**"
 - √ Latches closed on lid, door, etc (i.e. √ in landing config)
 - Crew Report: "**XX Latches done**"
 - √ Connectors for no bent pins, no FOD, inhibits in place
 - Crew Report: "**Pins good, no FOD, bend radius OK**"
 - Crew Report: "**Are inhibits in place?**"
2. Task Specific
 - √ Tethers and Tools clear prior to SSRMS or SRMS movement
 - Each EV report: "**Tethers and tools clear**"
3. Tool inventory
 - √ Tethers on MWS
 - Confirm all others as standard unless removed

RCC Repair Review

1. Task Review
 - Sequence for repairing crack and gouge
2. Material Behavior
 - Bubbles/swelling
 - Texture
 - Consistency/viscosity
 - Thickness
 - Stringiness
 - Tearing
 - Rolling
 - Adhesion
3. Hardware Performance
 - Extrusion force for applicator
 - Ability to stop flow from applicator
 - Adhesion to spatulas
 - Temp sensor usability
 - Spatula stiffness
 - EVA wipe capability
4. Calls
 - Tool retrievals (in/out of bag)
 - Start/stop material dispensing
 - RCC temps
 - Material change from WR1 → 3
5. Contingency Responses
 - Failed on gun
 - Lack of adhesion
 - Excessive fogging
 - Contamination

EVA 3 BRIEFING CARD (Cont)



Goals for Repair

- Focus on repairing exposed substrate/damage and then create smooth repair
- Minimize thin walled (WR1) voids
- Apply thin layers
- Minimize thickness of repair

Basic RCC Crack Repair Steps/Rationale

1. Wetting Layer
 - Penetrates damage (especially laminate) and provides a layer for the subsequent fill/mounding layer to adhere to
2. Filling Layer (gouge/spall only)
 - Brings repair up to OML while avoiding buildup on Type A
3. Mounding Layer (cracks only)
 - Provides extra layer to cover voids in wetting layer
4. Finishing Layer
 - Forms smooth aerodynamic shape

Crack/ Spall

Wetting layer

- A**
- Direct extrusion onto damage (WR1)
 - Remove excess material from carbon-carbon and continually clean Type A
 - Agitate deep damage to remove voids until WR3 before applying filling layer, and leaving no visible bubbles
 - Push into exposed carbon-carbon and cracks if present
 - If required, once agitated area is controlled, wet surrounding Type A (wetting area > mounding area ~2" around)
 - Remove excess material from Type A, leaving only a sheen (spatula should contact RCC during removal)

Fill layer

- B**
- Extrude material onto wing between 40 and 140F at wing location specified by MCC. Once in WR2 (per time/temp chart), transfer minimum material to damage site.
 - Swipe & continue working repair until WR3
 - Leave a flush finish with OML
 - Continually remove excess material from Type A
- For Gouge & Spall repairs only

Mounding layer

- C**
- Extrude material onto wing between 40 and 140F at wing location specified by MCC. Once in WR2 (per time/temp chart), transfer minimum material to damage site.
 - Push into crack
 - Swipe & continue working repair until WR3
 - Repair should be as thin as possible with a very slight mound
- For Crack repairs only

Finishing layer

- D**
- Direct extrusion onto repair (WR1) between 40 - 140 degrees F
 - Create thin layer over repair, while pushing material into crack/damage. This layer should be as thin as possible ($\leq 1/10$ " total thickness)
 - Use heavy parallel swipes to achieve smooth finish
 - Spread to get rid of voids and leave a smooth shape, leaving layer in WR 2.
 - Repeat finishing layer if material worked too long, voids present, or carbon-carbon is exposed

EVA 3 TOOL CONFIG

Pre-EVA Tool Configuration

AIRLOCK

- Staging Bag
- Fish stringer
- Connector Cleaner Tool Kit
- Wire Tie Caddy
- Spare PGT (s/n _____)
- PGT Battery (s/n _____)
- Connector Pin Straightener
- MWS Key Strap
- Velcro/Tape Caddy
- EVA Wipe**
- Spare Safety Tether (lg/sm 85')
- Pry Bar
- Probe**
- IV Bag
- Contamination Detection Kit
- Gold Salt Coupon (6)
- Color Chart (2)
- ISS Contamination Sampler (2)
- Shuttle Contamination Sampler (2)
- Nitrogen Dioxide Draeger Tube (6)
- Ammonia Draeger Tube (6)
- Ziplock Bag
- Towels (2)
- DCM Plug (2) (SAFER hard mount)
- GP Caddy (2)
- Thermal Mittens (2 pr)
- EVA Ratchet
- Socket Caddy
- 1/2 x 8-in socket (IV Hatch)
- 7/16 x 6-in socket (backup)
- D-Ring extender on EVA hatch D-Ring
- CRM Bag
- Ret equip tether (1 lg-sm) - airlock
- Adj equip tethers (4) - exterior corner
- Adj equip tethers (1 Lg, 1 sm) - exterior diag
- CRM applicator (3) w/Rets (3 sm-sm)
- 2-in spatulas (5)
- 5-in spatula
- Palettes (2)
- EVA wipes (6)
- Temp probe (1) w/ Ret (sm-sm)
- Fish Stringer
- EVA wipes (8)

Continued next page

EV1

- O2 Actuator Cover**
- MWS
- Right swing arm
- Ret equip tether (sm-sm)
- T-Bar
- Wire ties (2)**
- Small EVA trash bag
- SSRMS LEE CLA cover**
- Ret equip tether (sm-sm)
- Ret equip tether (sm-sm) w/pip pin
- Adj equip tether (2)
- BRT
- Wire ties (2)
- Ret equip tether (sm-sm)
- Waist tether (2)
- R - D-Ring
- L - D-Ring extender
- Spare safety tether (R- 85')
- D-Ring extender (2)
- SAFER

EV2

- O2 Actuator Cover**
- MWS
- Right swing arm
- Ret equip tether (sm-sm)
- T-Bar
- Wire ties (2)**
- Adj equip tether (2) - L & R d-ring**
- Small EVA trash bag
- Gap Spanner (45-72 in)**
- WIF adapter w/ pip pin**
- Ret equip tether (sm-sm)
- Ret equip tether (sm-sm) w/pip pin
- Adj equip tether
- BRT
- Wire ties (2)
- Ret Equip tether (sm-sm)
- Waist tether (2)
- R - D-Ring
- L - D-Ring Extender
- Spare safety tether (R- 85')
- D-Ring extender (2)
- SAFER

Post-EVA Tool Configuration

AIRLOCK

- Staging Bag
- Fish stringer
- Connector Cleaner Tool Kit
- Wire Tie Caddy
- Spare PGT
- PGT Battery
- Connector Pin Straightener
- MWS Key Strap
- Velcro/Tape Caddy
- EVA Wipe
- 85' Spare Safety Tether
- Pry Bar
- Probe**
- IV Bag
- Contamination Detection Kit
- Gold Salt Coupon (6)
- Color Chart (2)
- ISS Contamination Sampler (2)
- Shuttle Contamination Sampler (2)
- Nitrogen Dioxide Draeger Tube (6)
- Ammonia Draeger Tube (6)
- Ziplock Bag
- Towels (2)
- DCM Plug (2) (SAFER hard mount)
- GP Caddy (2)
- Thermal Mittens (2 pr)
- EVA Ratchet
- Socket Caddy
- 1/2 x 8-in socket (IV Hatch)
- 7/16 x 6-in socket (backup)
- D-Ring extender on EVA hatch D-Ring
- CRM Bag
- Ret equip tether (1 lg-sm) - airlock
- Adj equip tethers (4) - exterior corner
- Adj equip tethers (2) - exterior diag
- CRM applicator (3) w/Rets (3 sm-sm)
- 2-in spatulas (5)
- 5-in spatula
- Palettes (2)
- EVA wipes (___ of 6)
- Temp probe (1) w/ Ret (sm-sm)
- Fish Stringer
- EVA wipes (___ of 8)

Continued next page

EV1

- O2 Actuator Cover
- MWS
- Right swing arm
- Ret equip tether (sm-sm)
- T-Bar
- Wire ties (2)
- Small EVA trash bag
- WIF adapter
- Ret equip tether (sm-sm)
- Ret equip tether (sm-sm) w/ pip pin
- Adj equip tether (3)
- BRT
- Wire ties (2)
- Ret equip tether (sm-sm)
- Waist tether (2)
- Spare safety tether (R-85')
- D-Ring extender (2)
- SAFER

EV2

- O2 Actuator Cover
- MWS
- Right swing arm
- Ret equip tether (sm-sm)
- T-Bar
- Wire ties (2)
- Small EVA trash bag
- WIF adapter
- Ret equip tether (sm-sm)
- SSRMS LEE CLA Cover
- Ret equip tether (sm-sm) w/ pip pin
- Adj equip tether (2)
- BRT
- Wire ties (2)
- Ret Equip tether (sm-sm)
- Waist tether (2)
- Spare safety tether (R-85')
- D-Ring extender (2)
- SAFER

EVA 3 TOOL CONFIG (Cont)

CRM Bag, cont

- Large trash bag w/ Ret (sm-sm)
- Adj equip tether - bag opening
- 5-in spatula w/ wire tie
- Broom clip caddy (own RET)

Crewlock bag

- Ret equip tether to sunshade
- EVA Ratchet w/ Ret (sm-sm)
- 6-Ext 7/16
- Broom clip caddy (own RET)
- Digital camera w/ mount
- PGT (s/n _____), batt s/n _____

- Lg ORU Bag (sunshade)

- Lg-sm RET
- IR Camera (MASTER sw - ON)
- Sm-sm RET (to stow in box lid)

SSRMS

- WIF Adapter

GET AHEAD

- Large ORU Bag
- Ret equip tether (1 lg-sm) - airlock
- 1-Adj Equip Tether on bag (lg-sm)
- RJMC (s/n 1017), 4 cnctr caps rmvd
- Round Scoop w/ ret

Socket Caddy

12-Ext 7/16

CRM Bag, cont

- Large trash bag w/ Ret (sm-sm)
- Adj equip tether (exterior)
- 5-in spatula w/ wire tie
- EVA Wipes (____)
- Broom Clip Caddy

Crewlock bag

- Ret equip tether to sunshade
- EVA Ratchet w/ Ret (sm-sm)
- 6-Ext 7/16
- Broom clip caddy
- Digital camera w/ mount
- PGT

- Lg ORU Bag (sunshade)

- Lg-sm RET
- IR Camera
- Sm-sm RET

ISS Exterior

- Gap Spanner (A/L HR 529 - Lab HR 217)

IF NOT PERFORMED

- Large ORU Bag
- Ret equip tether (1 lg-sm) - airlock
- 1-Adj Equip Tether on bag (lg-sm)
- RJMC
- Round Scoop w/ ret

Socket Caddy

12-Ext 7/16

EVA 3 INHIBIT PAD

RCS

If EV crew < 27 ft from FRCS:

- | | |
|-----------|---|
| IV | 1. ✓ DAP: VERN, FREE, LO Z |
| O14,15,16 | 2. ✓ RJDF F1, F2, F3, F4 MANF DRIVER (four) – OFF
LOGIC (four) – OFF |
| MCC-H | 3. ✓ Above RCS config |
| IV | 4. ✓ RCS F – ITEM 1 EXEC (*)
✓ JET DES F1U – ITEM 17 (*)
F3U – ITEM 19 (*)
F2U – ITEM 21 (*) |

TCS

- | | | |
|----|-----|----------------------|
| IV | L12 | 1. ✓ TCS POWER – OFF |
|----|-----|----------------------|

S-Band

NOTE

Possible loss of comm when forced LL FWD antenna

- | | | |
|----|-----|---|
| IV | A1R | If EV crew < 1.6 ft. from S-Band antenna: |
| | | 1. S-BAND FM ANT – XMIT LOWER/RCVR UPPER |
| | | 2. ✓ MCC, lower antenna selected |
| | | If no comm., or on MCC call: |
| | C3 | 3. S-BAND PM ANT – LL FWD |
| | | When EVA crewmember at least 1.6 ft. away from all S-Band upper antennas: |
| | C3 | 4. S-BAND PM ANT – GPC |

KU-Band

- | | |
|-------|---------------------------------------|
| MCC-H | 1. ✓ KU-BAND Mask active |
| | 2. ✓ KU-BAND EVA Protect Box - active |

FGB Antennas

- | | |
|-------|------------------------|
| MCC-M | 1. ARISS -- Deactivate |
|-------|------------------------|

SM Antennas (MCC-M)

- | | |
|-------|---|
| MCC-M | 1. Global Timing Sys 1 (400.1 MHz) [GTS] – Deactivate |
| | 2. ARISS – Deactivate |

PCU

NOTE

PCUs may require up to 1 hr warm-up period before they are operational. No action is required in the event of one or two PCU failures while EVA.

- | | |
|-------|--|
| MCC-H | 1. ✓ PCUs (two) operational, in discharge mode |
|-------|--|

MISSE PEC 5

If EVA crew < 7 feet from MISSE PEC 5:

- | | |
|----------|--|
| MCC-H/IV | 1. ✓ MISSE PEC 5 - RESET, record timer information |
| | Else: |
| MCC-H | 2. ✓ MISSE PEC 5 Xmit - OFF |

Ground Radar

- | | |
|-------|---|
| MCC-H | 1. ✓ TOPO / RIO & FDO console, ground radar restrictions in place for EVA |
|-------|---|

EVA 3 NOTES, CAUTIONS, & WARNINGS

NOTES

General:

1. Bolt install: report torque and turns
2. Bolt release: report torque and turns if different from published range
3. CBM petal covers may not be used as handholds unless both launch restraint pins are engaged
4. Toolbox doors must be closed with 1 latch per door when EV crew not in immediate vicinity

RCC Repair:

1. Repair goal is to leave a smooth/mounded/ramped finish over cracks, spalls, and gouges
2. For elongated damages, final swipe works best along the length of the damage, tapering at the ends
3. Mounding/swiping, especially near the end of WR2, works best starting from the center of the repair and swiping to the outside

CAUTION

ISS Constraints:

- A. Avoid inadvertent contact with:
1. Grapple fixture shafts (drylube)
 2. PIP pins
 3. **TCS Reflectors [PMA 2]**
 4. APAS hardware [PMA 2]
 5. CETA Lights (Z-93 paint) [Lab, S1, Node 1]
 6. UHF Antennas [Lab]
 7. SASA RF Group [S1]
 8. **SSRMS cameras**
 9. **Open CBM petal covers and Lab window shutter**

CAUTION (Cont)

ISS Constraints (Cont):

B. For structural reasons:

1. Avoid vigorous body motions, quick grabs and kickoffs against tether restraints
2. Avoid performing shaking motions (sinusoidal functions) more than four cycles
3. Avoid kicking S1/P1 radiator beam
If any of these occur, wait 2-5 min to allow structural response to dissipate

C. Other:

1. WIS Antennas: do not use as handholds [Node 1]

Shuttle Constraints:

D. Avoid inadvertent contact with:

1. WVS Antenna [ODS truss]
2. Payload Bay wire harnesses, cables and connectors

E. No touch

1. Monkey fur [PLB]
2. Cameras: metallic surfaces [PLB]

F. TPS Sample Box:

1. **Inputs into the short RCC sample frames should be less than 38 lbs**

WARNING

ISS Constraints:

A. Avoid inadvertent contact with:

1. Grapple fixture targets and target pins
2. Stay 2 ft from S1/P1 radiator beam rotational envelope when beam is free to rotate

B. Handrails:

1. Handrails previously used for MISSE attachment may not be used as a safety tether point [A/L endcone 0566, A/L Tank 2 nad/fwd]

C. Pinch:

1. EV side of IV hatch during hatch operation (also snag hazard) [A/L]

D. RF radiation exposure:

1. Stay 3.6 ft from S-Band (SASA) high gain Antenna when powered [S1]
2. Stay 1.3 ft from S-Band (SASA) low gain Antenna when powered [S1]
3. Stay 1 ft from UHF Antenna when powered [Lab]

E. Sharp Edges:

1. Inner edges of WIF sockets
2. Spring loaded captive EVA fasteners (eg 6B-boxes, BMRRM) ; the end of the spring may protrude
3. **Keep hands away from SSRMS LEE opening & snares**

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EVA 3 NOTES, CAUTIONS, & WARNINGS (Cont)

WARNING (Cont)

ISS Constraints (cont):

F. Thermal:

1. **PMA handrails may be hot. Handling may need to be limited**
2. **Turn off glove heaters when comfortable temp reached to prevent bladder damage. Do not pull fingers out of gloves when heaters are on**
3. Uncovered trunnion pins may be hot
4. SSRMS/MBS operating cameras/lights may radiate large amounts of heat

Shuttle Constraints:

G. Arcing/Molten Debris:

1. **Stay above PLB sill when within 1 ft of powered ROEU connector [PLB]**
2. Stay ≥ 2 ft from exposed stbd fwd MPM contacts [PLB]

WARNING (Cont)

Shuttle Constraints (Cont):

H. RF radiation exposure:

1. Stay 3.28 ft from S-Band Antenna when powered
2. Stay 1 ft from top and side of UHF PLB Antenna radome surface when in high powered mode [ODS truss]
3. Stay 0.33 ft from top and side of UHF PLB Antenna radome surface when in low powered mode [ODS truss]
4. Remain below the level of the PLB door mold line for first 20 in aft of fwd bulkhead when S-Band Antenna powered [PLB]
5. Remain on the inboard side of the Stbd sill handrails for first 20 ft aft of fwd bulkhead when Ku-Band Antenna powered [PLB]

I. Sharp Edges:

1. PRLA grounding wipers [PLB]
2. Keep hands away from SRMS EE opening & snares
3. Backup RCC Temperature Probe (s/n 1001) tip has a sharp edge

J. Thermal:

1. **Illuminated PLB lights, do not touch**

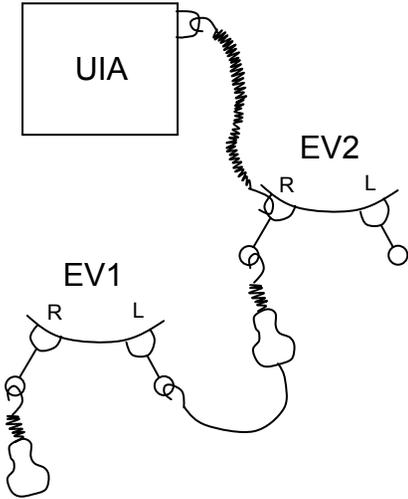
K. Thruster Contamination:

1. Stay out of the immediate vicinity of leaking jet or APU

EVA 3 SUMMARY TIMELINE

TASK TIME (PET TIME) HR : MIN	IV/SSRMS	EV1	EV2
00:00 ---	SSRMS: At APFR Install Setup posn	<u>POST DEPRESS and A/L EGRESS</u> (00:15)	<u>POST DEPRESS and A/L EGRESS</u> (00:15)
		<u>SSRMS SETUP</u> (00:40)	<u>SSRMS SETUP</u> (00:40)
01:00 --	SSRMS: Mnvr to TPS DTO Setup posn	<u>PLB SETUP</u> (00:40)	<u>PLB SETUP</u> (00:40)
02:00 --		<u>REPAIR</u> (03:00)	<u>REPAIR</u> (03:00)
03:00 --	SSRMS: Mnvr to APFR Egress Setup posn	<u>PLB CLEANUP</u> (00:45)	<u>PLB CLEANUP</u> (00:45)
04:00 --		<u>SSRMS CLEANUP</u> (00:55)	<u>SSRMS CLEANUP</u> (00:55)
05:00 ---	EVA Time 6:30	<u>A/L INGRESS and PRE REPRESS</u> (00:15)	<u>A/L INGRESS and PRE REPRESS</u> (00:15)
06:00 ---			

EVA 3 EGRESS (00:15)

TASK TIME (PET TIME) HR : MIN	IV/SSRMS	EV1	EV2
<p>00:00 (00:05)</p> <p>00:10 (00:15)</p>	<p>1. SSRMS: At Airlock APFR posn</p> 	<p><u>EGRESS</u> (00:10)</p> <p>NOTE Deploy MWS T-bar; install O2 actuator cover during SCU removal/stow</p> <p><u>Initial Config:</u> EV2's 85' safety tether hook end on own left D-Ring extender. Own 85' safety tether on right D-Ring ext</p> <ol style="list-style-type: none"> 1. Thermal cover - open 2. Egress airlock 3. Translate to SSRMS 4. Attach own 85' safety tether to SSRMS LEE tether point 5. Engage safety tether crew hook slide lock - L - ✓ safety tether reel unlocked 6. Release EV2's tether from self; transfer to EV2 7. Open Velcro flaps over grounding patches on back and port side of SSRMS LEE camera 8. Install cover over camera (long Velcro strap under lens) - Ensure camera and cover grounding patches are aligned, close 'PRESS' flaps on cover 	<p><u>EGRESS</u> (00:10)</p> <p>NOTE Deploy MWS T-bar; install O2 actuator cover during SCU removal/stow</p> <p><u>Initial Config:</u> Right waist tether on fwd UIA tether point. Own 85' safety tether reel end on own right D-Ring ext, hook end on EV1's left D-Ring ext</p> <ol style="list-style-type: none"> 1. Receive own 85' safety tether hook from EV1

SETUP (01:20)

TASK TIME (PET TIME) HR : MIN	IV/SSRMS	EV1	EV2
00:00 (00:15)	<p>As necessary:</p> <ol style="list-style-type: none"> SSRMS: On EV GO - to Airlock APFR Ingress posn <ol style="list-style-type: none"> IV: Verify SSRMS in standby prior to APFR ingress <ol style="list-style-type: none"> SSRMS: Mnvr to LMC JOCAS posn 	<p><u>SSRMS SETUP (00:40)</u></p> <ol style="list-style-type: none"> Retrieve APFR from stbd A/L toolbox Install APFR in SSRMS at 12 o'clock <ul style="list-style-type: none"> - Verify locking collar black-on-black - Perform pull test Configure APFR (12, PP, F, 6) Receive CRM bag from EV2 Temp stow bags on SSRMS outboard (APFR and SSRMS HRs); CRM bag to LEE Notify IV complete with SSRMS setup; as reqd mnvr to ingress posn <ol style="list-style-type: none"> Receive IR camera; stow on BRT (tether to cable) Retrieve fwd airlock safety tether; inspect load alleviating strap for damage Transfer safety tether to EV2; translate inboard & forward <ol style="list-style-type: none"> Check EV2 tether and SAFER config <ul style="list-style-type: none"> - √ SAFER MAN ISOL vlv - Open (dn) - √ SAFER HCM - Closed (dn) If not already performed: attach waist tether to APFR On IV GO: Ingress APFR Yaw APFR from 6 to 8 Notify SSRMS ready for mnvr 	<p><u>SSRMS SETUP (00:40)</u></p> <ol style="list-style-type: none"> Transfer CRM bag to EV1 <ol style="list-style-type: none"> Retrieve IR camera and turn MASTER sw - ON Transfer IR camera to EV1 <ol style="list-style-type: none"> Receive fwd airlock safety tether from EV1 Attach fwd airlock safety tether to right D-Ring ext Engage safety tether crew hook slide lock - L <ul style="list-style-type: none"> - √ safety tether reel unlocked Move right waist tether from UIA to safety tether Egress airlock; translate inboard & aft Check EV1 tether and SAFER config <ul style="list-style-type: none"> - √ SAFER MAN ISOL vlv - Open (dn) - √ SAFER HCM - Closed (dn) Close thermal cover <ol style="list-style-type: none"> Confirm yaw of EV1's APFR Translate to A/L WIF12 Remove; temp stow ingress aid (HR 0545) <ul style="list-style-type: none"> - Tank just aft of grapple fixture by WIF 12 Retrieve APFR; stow on BRT Translate to Lab endcone (via Lab nadir path) <ul style="list-style-type: none"> - Install gap spanner from A/L HR 0529 to Lab HR 0217 (zenith standoffs)

SETUP (01:20) (Cont)

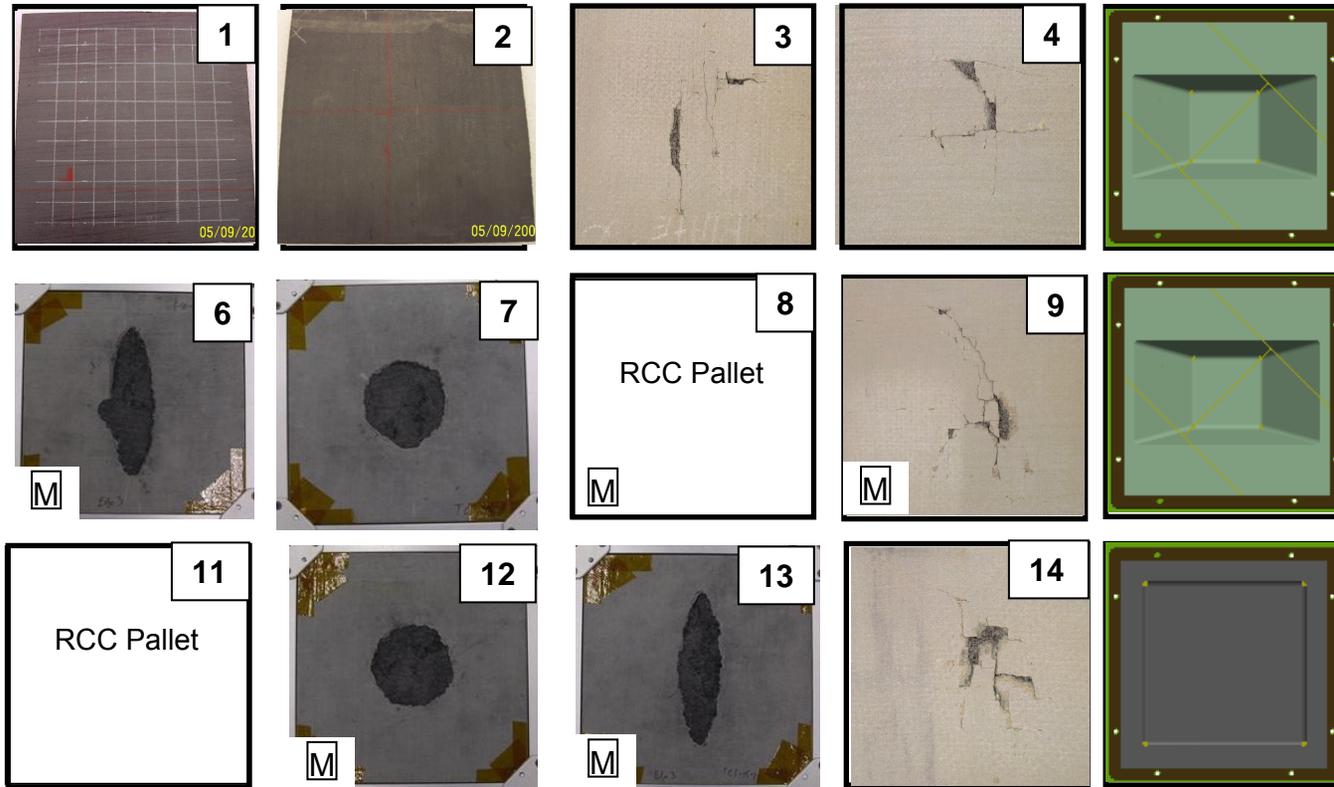
TASK TIME (PET TIME) HR : MIN	IV/SSRMS	EV1	EV2
00:40 (00:55)	<div data-bbox="226 344 659 716" data-label="Image"> </div> <ol style="list-style-type: none"> 1. SSRMS: On EV “Stop Motion”, pause JOCAS for WLE viewing 	<p>PLB SETUP (00:40)</p> <ol style="list-style-type: none"> 1. Mnvr to WLE viewing position 2. Open IR camera lens cover 3. As desired: activate LSR <ul style="list-style-type: none"> - Press and hold (3 sec) IR camera LSR button 4. Press FOCUS PRESET (+) until “inf” displayed 5. Press FINE FOCUS (+ or -) as necessary 6. When in viewing position: <ul style="list-style-type: none"> - Notify IV/SSRMS “Stop Motion” when viewing posn acceptable (pause JOCAS) <p style="text-align: center;"><u>NOTE</u> At least 2 RCC panels should be visible</p> <p style="text-align: center;">Do not turn camera off prior to transferring images to flash card</p> 7. Press F/A button 8. Record 20 sec IR camera movie 	<ul style="list-style-type: none"> - Fairlead at nadir HR 0231 (part of hwy) <ol style="list-style-type: none"> 16. Perform safety tether swap onto Lab endcone HR 0276 <ul style="list-style-type: none"> - Verify crew hook slide lock - L - ✓ safety tether reel unlocked <p>PLB SETUP (00:40)</p> <ol style="list-style-type: none"> 1. Translate to port Orbiter sill <ul style="list-style-type: none"> - Fairlead at fwd/port corner location 2. Translate to port of sample box 3. Install WIF adapter into bridge rail clamp (tether point aft) <ul style="list-style-type: none"> - Verify bridge rail clamp locks (2) - green 4. Install APFR into WIF adapter at 12 o'clock <ul style="list-style-type: none"> - Verify locking collar black-on-black - Perform pull test 5. Configure APFR (12, PP, L, 12) 6. Pull port latch pip pin open 7. Rotate port latch - U 8. Translate to sample box stbd side 9. Pull stbd latch pip pin open 10. Rotate stbd latch - U 11. Rotate sample box lid open 12. Remove stbd and port pip pins from temp stow; install in hinge

SETUP (01:20) (Cont)

TASK TIME (PET TIME) HR : MIN	IV/SSRMS	EV1	EV2
01:20 (01:35)	<p>7. IV: Verify PLB Cameras B and C directed away from TPS sample box - Can be used if necessary for clearance calls</p> <p>8. IV: Check w/ MCC for task order</p>	<p>21. Retrieve digital camera from crewlock bag; transfer to EV2</p> <p>22. Ingress SSRMS APFR</p> <p>23. Roll APFR 2 clicks to "H" (12, PP, H, 6)</p> <p>24. Retrieve EVA wipes and configure as necessary</p> <p>25. Check w/ MCC for task order</p> <p>26. Retrieve spatula as required</p> <p>27. √ Tethers clear of samples</p> <p style="text-align: center;"><u>NOTE</u> Verbalize actions during material evaluation to provide timeline of actions. Notify IV/MCC of visor fogging</p> <div style="border: 1px solid black; padding: 10px; margin: 10px auto; width: 80%;"> <p style="text-align: center;"><u>CAUTION</u></p> <p style="text-align: center;">Temp sensor has a 1 hour total exposure thermal clock</p> <p style="text-align: center;">Manual CRM applicator has a 1.5 hour total exposure thermal clock outside of the CRM bag</p> </div>	<p>20. Receive digital camera from EV2; stow on swing arm</p> <p>21. Retrieve broom clip caddy from CRM bag; stow on self</p> <p>22. As reqd: roll APFR 2 clicks to "J" (12,PP,J,12)</p> <p>23. Retrieve EVA wipes and configure as necessary</p> <p>24. Retrieve temp sensor; activate - Push display wake button - Verify display operational</p> <p>25. Measure temp of MCC requested sample _____ °C</p> <p>26. Check w/ MCC for task order</p> <p>27. Retrieve spatula as required</p> <p>28. √ Tethers clear of samples</p> <p style="text-align: center;"><u>NOTE</u> Verbalize actions during material evaluation to provide timeline of actions. Notify IV/MCC of visor fogging</p> <div style="border: 1px solid black; padding: 10px; margin: 10px auto; width: 80%;"> <p style="text-align: center;"><u>CAUTION</u></p> <p style="text-align: center;">Temp sensor has a 1 hour total exposure thermal clock</p> <p style="text-align: center;">Manual CRM applicator has a 1.5 hour total exposure thermal clock outside of the CRM bag</p> </div>

RCC SAMPLE LAYOUT

Orbiter Aft Bulkhead



M - microwis location

CRACK REPAIR – SAMPLES 3, 4, 9, 14

WETTING LAYER

1. Extrude NOAX directly (WR1) onto damage
Temp of RCC _____: _____: _____: _____
Time of extrusion ____:____, ____:____, ____:____, ____:____
2. Manipulate material w/ spatula
 - Push NOAX into cracks (multiple directions)
 - Wet surrounding Type A ~2" around
3. Continue to swipe/expose NOAX until WR3 achieved
4. Remove NOAX from Type A leaving only a sheen

MOUNDING LAYER

1. Verify previously applied material in WR3
2. Extrude NOAX onto RCC palette
Temp of RCC _____: _____: _____: _____
Time of extrusion ____:____, ____:____, ____:____, ____:____
3. Spread NOAX into a thin layer; continuously swipe.
Repeat for approximate time in chart to arrive at late WR2/early WR3 material
4. Transfer minimum amount of NOAX required to damaged area and the wetted surrounding Type A
 - Push NOAX into cracks (multiple directions)
 - Leave a smooth finish and very slight mound
 - Repair should be as thin as possible
 - Cover all Type A within < 1-in of damage
5. Continue working repair until WR3 achieved

FINISHING LAYER

NOTE

This layer may be left with small voids if required to ensure a smoother shape.

Do not work material into WR3

1. Extrude NOAX directly (WR1) onto repair site
Temp of RCC _____: _____: _____: _____
Time of extrusion ____:____, ____:____, ____:____, ____:____
2. Perform heavy parallel swipes until WR2
 - Repair should be as thin as possible
3. Do not go into WR3
4. Scrape any stray material from surrounding worksite
 - i.e. NOAX dribbles and clean palette
5. Repeat finishing layer if material worked too long, voids present, or carbon-carbon is exposed

PHOTO CLOSEOUT/PHOTOGRAMMETRY

1. On MCC GO - Perform photogrammetry (FS 7-107) or photo close-out for repaired samples

GOUGE/SPALL REPAIR – SAMPLES 6, 7, 12, 13

WETTING LAYER

1. Extrude NOAX directly (WR1) onto damage
Temp of RCC _____, _____, _____, _____
Time of extrusion ____:____, ____:____, ____:____, ____:____
2. Manipulate material w/ spatula
 - Push NOAX into exposed carbon-carbon and cracks, swiping in multiple directions
 - Wet surrounding Type A ~2" around
3. Continue to swipe/expose NOAX until WR3 achieved
4. Remove NOAX from Type A leaving only a sheen

FILL LAYER

1. Extrude NOAX onto RCC palette
Temp of RCC _____, _____, _____, _____
Time of extrusion ____:____, ____:____, ____:____, ____:____
2. Spread NOAX into a thin layer; continuously swipe.
Repeat for approximate time in chart to arrive at late WR2/early WR3 material
3. Transfer minimum amount of NOAX required to damaged area avoid surrounding Type A
 - Leave a flush finish with the OML
4. Continue working NOAX until WR3
5. Remove any excess material from Type A surface

FINISHING LAYER

NOTE

Goal is to have a nearly flush repair

This layer may be left with small voids if required to ensure a smoother shape.

Do not work material into WR3

1. Extrude NOAX directly (WR1) onto repair site
Temp of RCC _____, _____, _____, _____
Time of extrusion ____:____, ____:____, ____:____, ____:____
2. Perform heavy parallel swipes until WR2
 - Repair should be as thin as possible
3. Do not go into WR3
4. Scrape any stray material from surrounding worksite
 - i.e. NOAX dribbles and clean palette
5. Repeat finishing layer if material worked too long, voids present, or carbon-carbon is exposed

PHOTO CLOSEOUT/PHOTOGRAMMETRY

1. On MCC GO - Perform photogrammetry (FS 7-107) or photo close-out for repaired samples

RCC REPAIR – TASK DATA SHEET

Estimated Task Duration:

	With SSRMS	Without SSRMS
Two EV Crew	25-35 min per sample	same

Tools:

EV1	EV2
<ul style="list-style-type: none"> BRT (Setup activities, digital camera, IR camera, APFR) 85' safety tether CRM tools IR camera hardware 	<ul style="list-style-type: none"> BRT (Setup activities, digital camera, IR camera, APFR) 85' safety tether CRM tools IR camera hardware

Foot Restraints:

Task	WIF	APFR Setting
Ingress/Egress	SSRMS	12,PP,F,6
IR WLE Recording	SSRMS	12,PP,F,8
RCC Samples	SSRMS	12,PP,H,6
RCC Samples	Port sill bridge rail clamp	12,PP,J,12
RCC Repair tool bags	Port sill bridge rail clamp	12,PP,L,12

Notes:

- Best material application temp range expected between 110 and 70 degrees F, allowable range is ~140 to ~40 degrees F (43 – 21 deg C best, 60 – 4 deg C allowable)
- Verbalize actions during material evaluation to provide timeline of actions
- Repair goal is to leave a smooth finish over cracks, spalls, and gouges
- For elongated damages, final swipe works best along the length of the damage, tapering at the ends
- Mounding/swiping, especially near the end of WR2, works best starting from the center of the repair and swiping to the outside using heavy parallel swipes.
- If NOAX is sticking excessively to spatula, change spatulas (spatula may be cold)

Cautions:

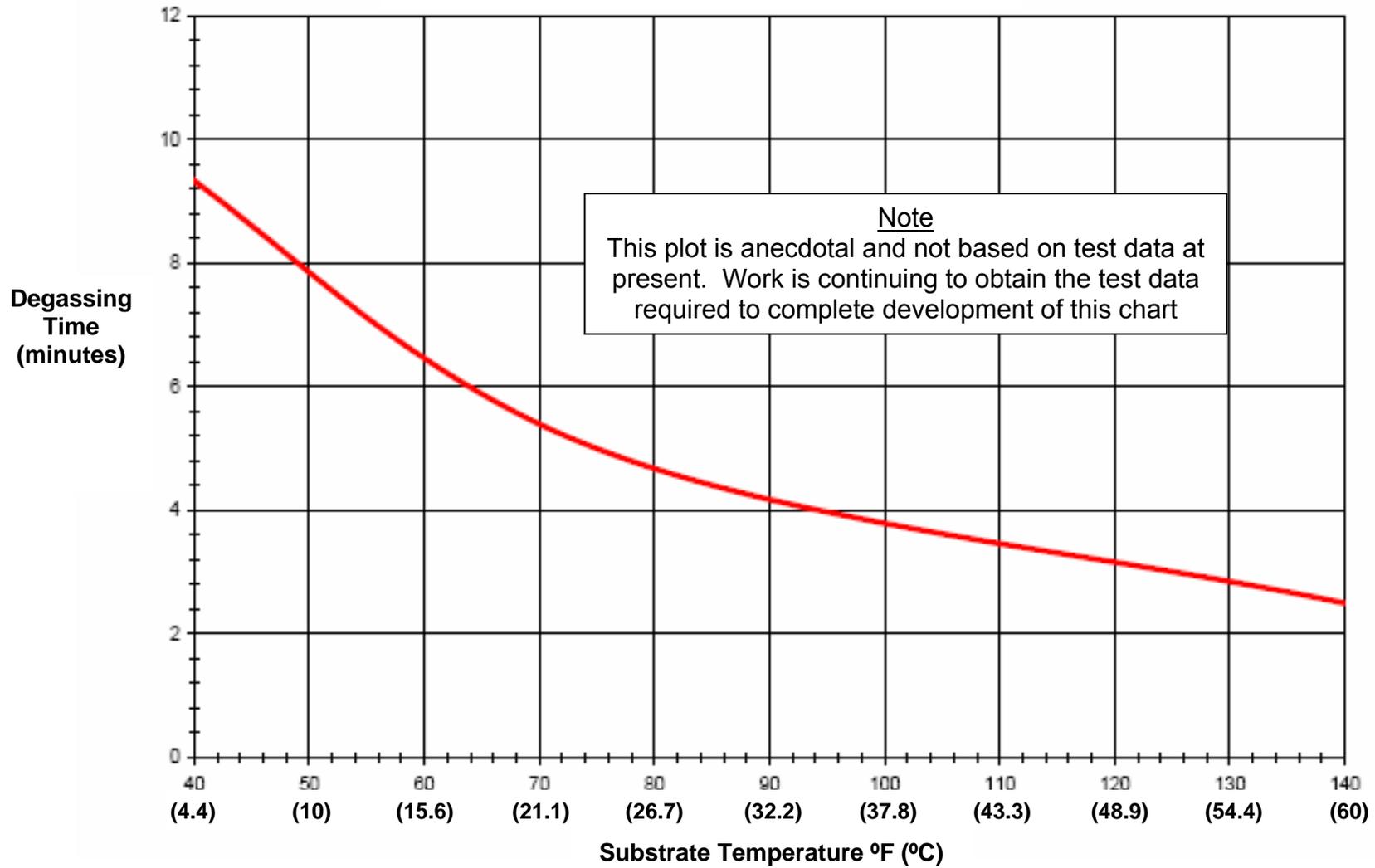
- Thermal sensor has a 1 hour total exposure thermal clock outside of the CRM bag
- Manual CRM applicator has a 1.5 hour total exposure thermal clock outside of the CRM bag
- If gun leaks and qty cannot be controlled, stow in large trash bag
- Use EVA wipes as often as required to keep visor clear

Warnings:

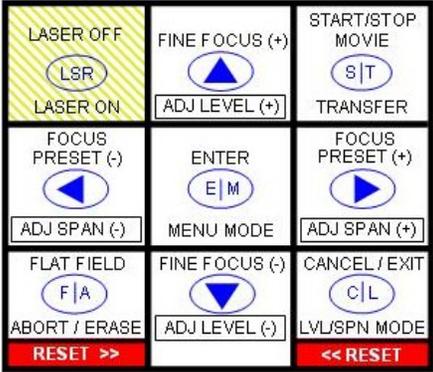
- None

RCC REPAIR – TASK DATA SHEET

DEGASSING TABLE



IR CAMERA SAMPLE BOX RECORDING (00:20)

TASK TIME (PET TIME) HR : MIN	IV/SSRMS	EV1	EV2
00:00	<p>1. SSRMS: To IR Hover posn</p> 	<p><u>NOTE</u> IR Camera imaging is ON CALL from MCC.</p> <p><u>RCC SAMPLE BOX RECORDING</u></p> <ol style="list-style-type: none"> 1. If reqd: Ingress SSRMS APFR 2. Receive IR camera from EV2 3. Toggle ENABLE sw up 4. Configure camera as reqd on self <p><u>NOTE</u> 5 MIN must elapse after toggling ENABLE sw up and before performing flat field correction</p> <ol style="list-style-type: none"> 5. Stow camera housing on BRT 6. Stow remote control unit on MWS 7. As req'd: receive sunshade from EV2 8. As reqd: GCA to recording position <p><u>NOTE</u> Do not turn camera off prior to transferring images to flash card</p> <ol style="list-style-type: none"> 9. Open IR camera lens cover 10. Press FOCUS PRESET (-) until "6.0ft" displayed 11. Press FINE FOCUS (+ or -) as necessary 12. Verify sunshade will shadow samples 13. Center camera on 2 aft/stbd samples (no repair) 14. Verify samples receiving direct sunlight 15. Press F/A button 	<p><u>RCC SAMPLE BOX RECORDING</u></p> <ol style="list-style-type: none"> 1. Retrieve IR camera; transfer to EV1 2. Retrieve & unfold sunshade <ul style="list-style-type: none"> - Transfer sunshade to EV1 or keep and provide shading as necessary <p>3. Monitor EV1's clearance with aft bulkhead</p>

IR CAMERA – TASK DATA SHEET

Estimated Task Duration:

	With SSRMS	Without SSRMS
One EV Crew	00:20	---

Tools:

EV1	EV2
<ul style="list-style-type: none"> IR Camera BRT 	

Foot Restraints:

Task	WIF	APFR Setting
WLE RCC Imaging	SSRMS	12,PP,F,8
TPS Sample Box Imaging	SSRMS	12,PP,F/H,6

Notes:

- Five minutes must elapse after turning camera on before performing flat field correction
- Do not turn camera off prior to transferring images to flash card
- Temperature measuring range is -40°F to 250°F
- Camera FOV is about 24° x 18°
- Laser times out after 10 minutes
- When recording has been initiated, all camera buttons are disabled except the laser
- Delaminations are better seen with a straight on viewing angle, and cracks are better seen at oblique angles
- Ground testing has shown about 6 hours of battery life with camera continuously on at full power.

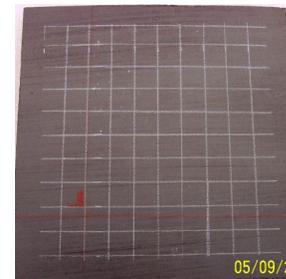
Cautions:

- Do not touch IR camera lens
- Camera lens cover must be opened within 1.5 hours after it has been fully powered on. No issues if in standby.

Warnings:

- None

IR Camera Samples



Orbiter Stbd Sample



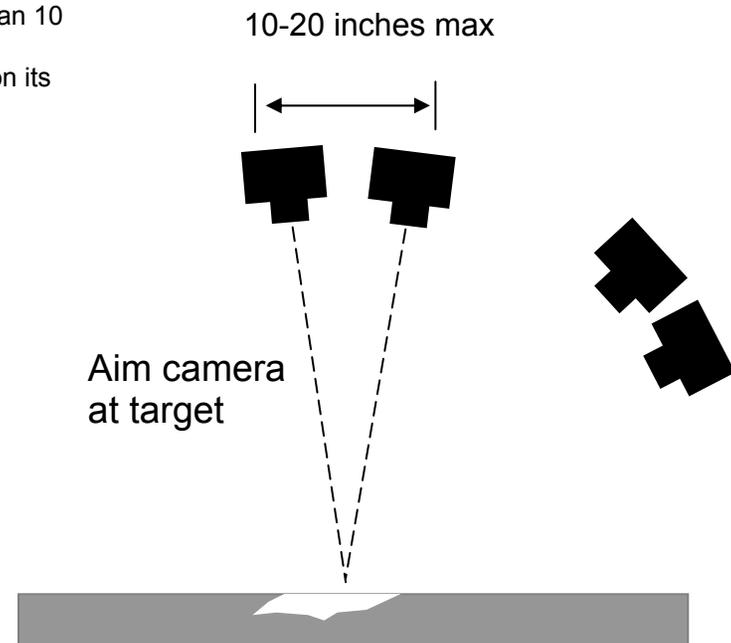
Orbiter Port Sample

PHOTOGRAMMETRY – TASK DATA SHEET

SSRMS: Mnvx to IR Hover posn

TECHNIQUE:

1. Photographs must be captured during orbit day, without flash, within ~2.5 minutes
2. Take a minimum of 10 pictures w/ slight off-set between shots
 - a. Ensures that 2 are usable for analysis
3. Not required to see through viewfinder
 - a. Highly recommended if possible
4. Take pictures from 5-10 feet
 - a. Ensures adequate field of view and resolution
5. Angle to the surface: 90-45 deg
 - a. Preferred closer to 90 deg
6. Have about 10 to 20-inches of camera lateral motion max between shots
 - a. Maximum camera motion should be 2" for each foot away from the damage. (i.e. At a range of 5 feet, don't move the camera more than 10 inches between shots.)
 - b. Include a dimensional reference - aluminum frame is used based on its known dimensions to scale the damage



CLEANUP (01:40)

TASK TIME (PET TIME) HR : MIN	IV/SSRMS	EV1	EV2
00:00 (04:35)	<p>1. SSRMS: To LMC Egress posn</p> <p>2. IV: Verify tool stowage</p> <p>Crewlock Bag</p> <ul style="list-style-type: none"> <input type="checkbox"/> EVA Ratchet w/ 6-in ext <input type="checkbox"/> Broom clip caddy <input type="checkbox"/> PGT <p>CRM Bag</p> <ul style="list-style-type: none"> <input type="checkbox"/> Applicators (3) <input type="checkbox"/> 2-in spatulas (5) <input type="checkbox"/> 5-in spatula <input type="checkbox"/> Palettes (2) <input type="checkbox"/> EVA wipes (___ of 6) <input type="checkbox"/> Temp probe <input type="checkbox"/> Fish Stringer w/___wipes <input type="checkbox"/> Large trash bag <input type="checkbox"/> Broom clip caddy <p>EV2</p> <ul style="list-style-type: none"> <input type="checkbox"/> Digital camera w/ mount <p>3. Tool Inventory</p> <p>4. SSRMS: To LMC JOCAS posn</p>	<p><u>PLB CLEANUP (00:45)</u></p> <ol style="list-style-type: none"> 1. Clean NOAX off gloves as reqd 2. GCA as reqd 3. On IV GO, reposition APFR back to "F" 4. Egress SSRMS APFR 5. Stow tools/hardware in respective bags <ul style="list-style-type: none"> - Do not stow IR camera in bag 6. Inspect EV2 for NOAX on EMU; clean off 7. Attach own ret to CRM bag 8. Reposition sunshade on CRM bag 9. Receive CRM bag from EV2; stow on SSRMS 10. Receive IR camera; stow on LMC HR 11. Translate to stbd of sample box 12. Remove hinge pip pin; stow on lid 13. Close lid 14. Stbd latch - L 15. Engage stbd latch pip pin; Velcro 16. Reposition IR camera to top of TPS sample box 17. Perform safety tether swap w/ EV2 <ul style="list-style-type: none"> - Verify crew hook slide lock - L - ✓ safety tether reel unlocked 18. Perform tool inventory 19. Retrieve port sill APFR; stow on BRT 20. Retrieve WIF adapter 21. Confirm yaw of EV2's APFR 	<p><u>PLB CLEANUP (00:45)</u></p> <ol style="list-style-type: none"> 1. Monitor clearance between EV1's helmet and aft bulkhead 2. Stow tools/hardware in respective bags 3. Inspect EV1 for NOAX on EMU; clean off 4. Reposition sunshade on CRM bag 5. Retrieve CRM bag; transfer to EV1 6. Retrieve IR camera; transfer to EV1 7. Translate to port of sample box <ul style="list-style-type: none"> - Don't use LMC soft strap 8. Remove hinge pip pin; stow on lid 9. Close lid 10. Port latch - L 11. Engage port latch pip pin; Velcro 12. Perform safety tether swap w/ EV1 <ul style="list-style-type: none"> - Verify crew hook slide lock - L - ✓ safety tether reel unlocked 13. Perform tool inventory 14. Attach waist tether to SSRMS APFR 15. Ingress SSRMS APFR 16. Yaw APFR to 8 (12, PP, F, 8) 17. Retrieve IR camera from sample box 18. Notify SSRMS operator ready for mnvr 19. Toggle ENABLE sw up <p style="text-align: center;"><u>NOTE</u></p> <p style="text-align: center;">At least 2 RCC panels should be visible.</p> <p style="text-align: center;">Do not turn camera off prior to downloading video to flash card</p>

CLEANUP (01:40) (Cont)

TASK TIME (PET TIME) HR : MIN	IV/SSRMS	EV1	EV2
00:45 (05:20)	<p>5. SSRMS: JOCAS to Airlock APFR posn; pause at position used for EV1 WLE imaging</p> <p>6. IV: Notify EV2 when approaching WLE imaging position, take video of panels _____</p> <p>7. IV: RCC panels in FOV _____</p> <p>8. IV: LCD time ____:____</p> <p>9. SSRMS: To Airlock APFR posn</p>	<p><u>SSRMS CLEANUP (00:55)</u></p> <ol style="list-style-type: none"> 1. Translate to Lab endcone HR 0276; retrieve adj tether fairlead 2. Perform safety tether swap onto airlock safety tether <ul style="list-style-type: none"> - Verify crew hook slide lock - L 3. Translate to A/L WIF 12 4. Stow APFR <ul style="list-style-type: none"> - Verify locking collar black-on-black - Perform pull test 5. Inform IV of final APFR settings (__, __, __, __) 6. Re-install ingress aid in APFR 7. Perform tool inventory 	<p style="text-align: center;"><u>NOTE</u></p> <p>5 MIN must elapse after turning ENABLE sw - ON and before performing flat field correction</p> <p>20. Stow IR camera on BRT</p> <p><u>SSRMS CLEANUP (00:55)</u></p> <ol style="list-style-type: none"> 1. Mnvr to WLE viewing position 2. Open IR camera lens cover 3. As desired: activate LSR <ul style="list-style-type: none"> - Press and hold (3 sec) IR camera LSR button 4. Press FOCUS PRESET (+) until "inf" displayed 5. Press FINE FOCUS (+ or -) as necessary 6. Press F/A button 7. Record 20 sec IR camera movie <ul style="list-style-type: none"> - Press S/T button - Verify "REC" on display; frame count decreasing - Record 20 sec IR movie - If possible, call out RCC panels in FOV, IV record - Call out time on LCD screen, IV record - After 20 sec, press S/T button - Press and hold (3 sec) S/T button - Verify transfer complete - 99% READY 8. Continue mnvr to ISS A/L 9. As desired: Perform IR recording of Shuttle and ISS as desired

CLEANUP (01:40) (Cont)

TASK TIME (PET TIME) HR : MIN	IV/SSRMS	EV1	EV2
01:40 (06:15)		<div data-bbox="814 329 1356 451" style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="text-align: center;">CAUTION</p> <p>Avoid touching NOAX contaminated gloves/tools to airlock seals</p> </div> <p>8. Ingress airlock</p> <p>9. Attach right waist tether to fwd UIA tether point</p> <p>10. Detach own airlock safety tether from right D-Ring extender and transfer to EV2</p> <p>11. Receive IR Camera; stow in airlock</p> <p>12. Receive bags from EV2; stow in airlock</p>	<p>10. As req'd: press LSR button (OFF)</p> <p>11. Toggle ENABLE sw up (hold for 5 sec) - √ MASTER sw - ON</p> <p>12. Close lens cover</p> <p>13. Stow IR camera on MWS</p> <p>14. Perform tool inventory</p> <p>15. GCA as reqd - If necessary, yaw APFR back to 6 for egress</p> <p>16. Egress SSRMS APFR</p> <p>17. Receive airlock safety tether from EV1</p> <p>18. Stow EV1 safety tether on airlock handrail (fwd posn), verify tether reel is in "UNLOCK"</p> <p>19. Transfer IR Camera to EV1</p> <p>20. Push 'PRESS' label on SSRMS LEE camera cover</p> <p>21. Remove camera cover; temp stow</p> <p>22. Close Velcro flaps over grounding patches on LEE camera</p> <p>23. Retrieve bags; transfer to EV1 - CRM bag/crewlock bag/sunshade</p> <p>24. Remove APFR from SSRMS</p> <p>25. Stow APFR in stbd toolbox WIF (8,PP,D,12) - Verify locking collar black-on-black - Perform pull test</p> <p>26. Retrieve WIF adapter</p>

EVA 3 INGRESS (00:15)

TASK TIME (PET TIME) HR : MIN	IV/SSRMS	EV1	EV2
00:00 (06:15)	1. SSRMS: To Airlock Clear posn	<p><u>INGRESS</u> (00:10)</p> <ol style="list-style-type: none"> 1. Transfer hook end of 85' safety tether to EV2 2. Open O2 actuator cover; Velcro to self 3. Connect SCU to DCM; ✓ SCU locked 4. WATER - OFF (fwd) <div data-bbox="711 862 1251 987" style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p style="text-align: center;"><u>CAUTION</u></p> <p style="text-align: center;">Do not close hatch until EMU water - OFF for 2 min</p> </div>	<p><u>INGRESS</u> (00:10)</p> <ol style="list-style-type: none"> 1. Attach EV1's safety tether hook to own left D-Ring ext - Verify crew hook slide lock - L 2. Release own safety tether from SSRMS LEE; stow 3. Notify IV when SSRMS clear to mnvr away <div data-bbox="1333 516 1873 641" style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p style="text-align: center;"><u>CAUTION</u></p> <p style="text-align: center;">Avoid touching NOAX contaminated gloves/tools to airlock seals</p> </div> <ol style="list-style-type: none"> 4. Ingress airlock 5. Close hatch thermal cover; attach Velcro strap 6. Open O2 actuator cover; Velcro to self 7. Connect SCU to DCM; ✓ SCU locked 8. WATER - OFF (fwd) <div data-bbox="1325 862 1864 987" style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p style="text-align: center;"><u>CAUTION</u></p> <p style="text-align: center;">Do not close hatch until EMU water - OFF for 2 min</p> </div>
00:10 (06:25)		5. GO to PRE-REPRESS (DEPRESS/REPRESS Cue Card)	<ol style="list-style-type: none"> 9. Verify outer hatch clear of hardware; hatch - close and lock 10. GO to PRE-REPRESS (DEPRESS/REPRESS Cue Card)